Improving influenza surveillance in sub-Saharan Africa

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Abstract

Little is known about the burden of influenza in sub-Saharan Africa. Routine influenza surveillance is key to getting a better understanding of the impact of acute respiratory infections on sub-Saharan African populations.

A project known as Strengthening Influenza Sentinel Surveillance in Africa (SISA) was launched in Angola, Cameroon, Ghana, Nigeria, Rwanda, Senegal, Sierra Leone and Zambia to help improve influenza sentinel surveillance, including both epidemiological and virological data collection, and to develop routine national, regional and international reporting mechanisms. These countries received technical support through remote supervision and onsite visits. Consultants worked closely with health ministries, the World Health Organization, national influenza laboratories and other stakeholders involved in influenza surveillance.

Influenza surveillance systems in the target countries were in different stages of development when SISA was launched. Senegal, for instance, had conducted virological surveillance for years, whereas Sierra Leone had no surveillance activity at all.

Working documents such as national surveillance protocols and procedures were developed or updated and training for sentinel site staff and data managers was organized.

Targeted support to countries can help them strengthen national influenza surveillance, but long-term sustainability can only be achieved with external funding and strong national government leadership.

Introduction

Acute respiratory infections are major contributors to morbidity and mortality in Africa, yet the burden of influenza in African countries is still poorly understood. In the AfriFlu meeting that was held in June 2010 in Marrakesh, Morocco, influenza specialists and public health experts pledged to follow concrete measures to bridge the knowledge gap on the burden of influenza in Africa. One of the key measures recommended was the reinforcement of routine influenza surveillance capacity both from an epidemiological and a virological standpoint. Surveillance data from the African continent has increased substantially in the past five years, but they are still too sparse and inconsistent to allow for a thorough understanding of influenza virus circulation patterns on the continent and their associated morbidity and mortality, or to inform influenza control strategies.

Generating robust seasonal influenza surveillance data is a concern both regionally and globally. The 2009 influenza pandemic had highlighted the importance of using a standardized approach and terminology in conducting influenza surveillance activities. In March 2011, the World Health Organization (WHO) held an expert consultation in Geneva, Switzerland, to develop global standards for influenza surveillance. The specific aims of the meeting were to update case definitions for influenza-like illness (ILI) and severe acute respiratory infection (SARI) and to provide guidance on creating and maintaining influenza sentinel surveillance systems.

The primary objective of the SISA project was to develop or strengthen influenza sentinel surveillance systems in line with WHO standards in selected sub-Saharan African countries. Countries were chosen in a way intended to synergistically enhance the surveillance capacity development activities being supported in the region by other organizations. The ultimate goal was to generate a representative network of functional surveillance systems that would provide a reasonably accurate picture of influenza activity on the African continent. Countries were given support in the development of routine influenza data collection, analysis and reporting mechanisms.
at the national and international level, the latter via global databases.

During the field implementation of the project, three epidemiologists were deployed to the capitals of Angola, Cameroon and Sierra Leone to assist in the organizational, technical and managerial aspects of strengthening influenza surveillance and to provide support in developing influenza sentinel surveillance protocols and operating procedures. Five additional countries – Ghana, Nigeria, Rwanda, Senegal and Zambia – received technical support through remote supervision and onsite visits by two other epidemiologists. Consultants worked in close collaboration with health ministries, WHO, national influenza laboratories and other partners involved in influenza surveillance (such as the United States Naval Medical Research Unit No.3 [NAMRU-3] in Cairo, and the Institut Pasteur International Network, headquartered in Paris).

The first step of the project was to assess ongoing influenza activities, identify shortcomings and challenges, and recommend improvements with regard to epidemiological and virological data collection, analysis, reporting and sharing. Subsequently, the work focused on providing technical support to surveillance staff in sentinel sites and in the health ministries in implementing the recommended improvements through the development of country-specific protocols and standard operating procedures.

Results

The SISA project targeted countries whose influenza surveillance systems were in different stages of development. For example, when the project started, Sierra Leone had no influenza surveillance activity, whereas Senegal had a long history of virological surveillance. The project had to adapt to different country contexts and find the most appropriate ways to support existing partners and strengthen surveillance systems. Much of the activity focused on developing or supporting the epidemiological component of surveillance, which was generally identified as the weakest element of the existing systems. In-country support to influenza surveillance activities lasted approximately eight months, from May to December 2011.

Practical protocols and operating procedures were developed to obtain a core set of epidemiological surveillance data of good quality despite the limited human and financial resources. Emphasis was placed on discussing with national partners the usefulness of sharing influenza surveillance data with the international community via WHO’s global influenza surveillance databases. Training on the use of these databases was provided to data managers in health ministries, to national public health laboratories and to other relevant partners.

The case definitions used for ILI and SARI followed – with some minor country variations – the ones given in WHO’s regional guidelines.4 Several valuable lessons emerged from implementing the SISA project (Box 2). The active involvement of the health authorities in the SISA project was one of the key elements in its success. From the beginning of the project, responsibility for sustainably improving the functioning of the surveillance system remained with health ministry staff, who built on existing national surveillance mechanisms. Public health professionals showed keen interest in obtaining an accurate estimate of the health impact of influenza, especially within the overall burden of respiratory disease.

The approaches used to improve influenza surveillance varied between countries. In general, SISA worked through a step-by-step process, with initial efforts focused on a small number of sentinel sites. The purpose of this was to obtain a core set of high-quality data rather than to try to immediately implement a multi-site, comprehensive national system that would be difficult to support and to routinely supervise.
When the World Health Organization (WHO) initiated the SISA project in January 2011, Sierra Leone had no influenza surveillance capacity in place. The project was implemented by deploying a SISA epidemiologist to the capital, Freetown.

Different working groups were formed with personnel from the National Public Health Laboratory, the Ministry of Health, the WHO country office and the identified sentinel surveillance sites. The project progressed smoothly thanks to the strong leadership of the health ministry and WHO’s country office. Management structures, clear roles and responsibilities and a data flowchart were developed to put in place the epidemiological and virological components of the influenza surveillance system.

To implement the surveillance system the necessary influenza surveillance protocols and procedures were developed and adopted, and training activities for clinical staff and data managers were organized.

Laboratory capacity was assessed and medium-term plans for building national influenza testing capacity through the use of polymerase chain reaction (PCR) were developed. To rapidly set up the virological component of the system, collaboration with the Institut Pasteur in Dakar, Senegal, was begun. The existing Integrated Disease Surveillance and Response infrastructure allows specimens to be shipped to Dakar weekly for PCR testing.

Influenza surveillance activities started in August 2011. ILI and SARI were being monitored in four sentinel sites in Freetown that covered both children and adults. All epidemiological data are collated and analysed at the Ministry of Health and reported through WHO’s FluID database. From August to December 2011, 1235 ILI cases (12.9% of all consultations) and 282 SARI cases (4.6% of all hospitalizations) were identified. Samples were collected from 268 ILI and 238 SARI patients ranging in age from 1 month to 62 years. Laboratory results were available for 473 samples, of which 12.7% tested positive for influenza virus ribonucleic acid (RNA). Among the positive samples, 55 (91.7%) had subtype A(H3N2); 4 (6.7%) had subtype A(H1N1)pdm09 and 1 (1.7%) had H1N1pdm and A(H3).

None of the samples tested positive for influenza type B viral RNA.

Nevertheless, some countries, in keeping with SISA’s country-driven approach, chose to implement surveillance in a larger number of sites.

Many target countries were receiving external support from international partners, including the CDC, NAMRU-3, the US Department of Health and Human Services and the Institut Pasteur International Network or independent Institut Pasteur laboratories. Assistance focused on technical and financial support for virological specimen and data collection. Since substantial laboratory activities existed at the start of the SISA project, a key SISA objective was to enlist the support of virology laboratory staff for improving epidemiological surveillance.

In some countries data collection proved more difficult or time-consuming than anticipated. This was especially true for age-specific counts of ILI and SARI cases using WHO case definitions and for counts of total consultations/hospitalizations (necessary to estimate incidence and temporal trends). A key SISA activity was to assist countries in developing processes to minimize the extra workload required of site personnel and thus improve the likelihood of project sustainability.

Despite these challenges, the project yielded tangible results. Epidemiological influenza data collection started in all of the target countries. The results obtained in Sierra Leone are given in Box 3 by way of an example.

Conclusion

The establishment and strengthening of national surveillance capacity supports the long-term goal of generating improved data for national decision-making. While much work remains to be done, SISA achieved many of its objectives in connection with improved influenza surveillance. Data collection began where none existed; national influenza plans were developed, and countries were re-oriented towards a vision of more accurate and limited data collection, privileging data quality over quantity. Additionally, the project catalysed national interest in influenza and more generally in respiratory disease surveillance and in implementing more rigorous surveillance methods. Overall, SISA has demonstrated that targeted external field support can successfully help countries to start new influenza surveillance systems or reinvigorate existing ones.

SISA’s sustainability will depend on several factors. In the short term additional external funding will probably be needed to sustain gains and further improve influenza surveillance systems. The long-term sustainability of externally-funded national influenza surveillance in Africa will depend on convincing health authorities of the usefulness of surveillance data for national and regional preventive and clinical management programmes, national economic growth, and successful intervention for other pressing health care priorities.

Acknowledgements

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Amélioration de la surveillance de la grippe en Afrique sub-saharienne

Problème
On sait peu de chose des conséquences de la grippe en Afrique sub-saharienne. Une surveillance régulière de la grippe est la clé d’une meilleure compréhension de l’impact des infections respiratoires aiguës sur les populations d’Afrique sub-saharienne.

Approche
Un projet conçu sous le nom de Renforcement de la surveillance sentinelle de la grippe en Afrique (SISA) a été lancé en Angola, au Cameroun, au Ghana, au Nigeria, au Rwanda, au Sénégal, en Sierra Leone et en Zambie pour aider à améliorer la surveillance sentinelle de la grippe, y compris la collecte des données épidémiologiques et virologiques, et développer des mécanismes réguliers de rapports nationaux, régionaux et internationaux. Ces pays ont reçu un appui technique combinant une surveillance à distance et des visites sur place. Des consultants ont travaillé en étroite collaboration avec les ministères de la santé, l’Organisation mondiale de la Santé, les laboratoires nationaux de流感监测,但是长期的可持续性只能通过外部资金和强大的国家政府才能实现。

Résumé

改善撒哈拉以南非洲的流感监测

问题
撒哈拉以南非洲的流感负担情况所知甚少。日常流感监测是更好理解急性呼吸道感染对撒哈拉以南非洲人口影响的关键。

方法
在安哥拉、喀麦隆、加纳、尼日利亚、卢旺达、塞内加尔、塞拉里昂和赞比亚启动项目。通过一系列措施提升国家流感监测能力。在启动 SISA 项目时，目标国家处于流感监测系统不同发展阶段。例如，塞内加尔已经运行多年的病毒监测系统，而塞拉里昂则根本没有监测活动。

相关变化
制定或更新国家监测方案和流程等工作文档。例如，项目合作伙伴包括卫生部门、世界卫生组织、国家流感监测实验室和其他流感监测机构，所有这些国家通过远程监控和现场访问获取技术支持。顾问人员与国家政府、WHO、国家实验室和其他利益相关者密切合作。经过数年的努力，SISA 项目在很多国家成功启动。

经验教训
有针对性的支持可以帮助各个国家加强国家流感监测，但是长期的可持续性只能通过外部资金和强大的国家政府才能实现。

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Résumé

Le projet SISA, qui a été lancé en Angola, au Cameroun, au Ghana, au Nigeria, au Rwanda, au Sénégal, en Sierra Leone et en Zambie, a permis d’améliorer la surveillance de la grippe en Afrique. Les pays ont reçu un appui technique combinant une surveillance à distance et des visites sur place. Des consultants ont travaillé en étroite collaboration avec les ministères de la santé, l’Organisation mondiale de la Santé, les laboratoires nationaux de流感监测,但是长期的可持续性只能通过外部资金和强大的国家政府才能实现。
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